

	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	1916	((light adj emitting adj diode) laser) and gan	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:32
2	BRS	L2	175	1 and ni and au	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:30
3	BRS	L3	17	2 and ((heat adj treat) anneal)	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:31
4	BRS	L4	2027	((light adj emitting adj (diode diodes)) (laser lasers)) and gan	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:33
5	BRS	L5	179	4 and ni and au	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:33

	Type	L #	Hits	Search Text	DBs	Time Stamp
6	BRS	L6	115	5 and ((heat adj treat\$4) anneal\$4)	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:35
7	BRS	L7	48	6 and @ay<1997	USPAT; US-PGP UB; EPO; JPO; DERWEN T; IBM TDB	2001/07/17 13:36

05772607 Genuine Article#: WX008 Number of References: 6

Title: UV, blue and green light emitting diodes based on GaN-InGaN multiple quantum wells over sapphire and (111) spinel substrates

Author(s): Khan MA (REPRINT) ; Chen Q; Yang J; Sun CJ; Lim B; Temkin H; Schetzina J; Shur MS

Corporate Source: APA INC, APA OPT, 2950 NE 84TH LANE/BLAINE//MN/55449 (REPRINT); COLORADO STATE UNIV, /FT COLLINS//CO/80523; N CAROLINA STATE UNIV, /RALEIGH//NC/27695; UNIV VIRGINIA, DEPT ELECT ENGN/CHARLOTTESVILLE//VA/22903

Journal: MATERIALS SCIENCE AND ENGINEERING B-SOLID STATE MATERIALS FOR ADVANCED TECHNOLOGY, (1997) V43, N1-3 (JAN), P265-268

ISSN: 0921-5107 Publication date: 19970100

Publisher: ELSEVIER SCIENCE SA LAUSANNE, PO BOX 564, 1001 LAUSANNE 1, SWITZERLAND

Language: English Document Type: ARTICLE

Geographic Location: USA

Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences; CC ENGI--Current Contents, Engineering, Computing & Technology

Journal Subject Category: MATERIALS SCIENCE; PHYSICS, CONDENSED MATTER

Abstract: Recently Nakamura et al. have reported on high brightness visible LEDs based on **AlGaIn**-InGaIn multiple quantum wells (MQWs) using atmospheric pressure metal-organic chemical vapor deposition (MOCVD) and **AlGaIn** barrier layers around an InxGa1-xN-InyGa1-yN multiple quantum well region. We now report the fabrication of high brightness vertical cavity UV, blue and green light emitting diodes using low pressure MOCVD with **GaN**-InxGa1-xN multiple quantum wells surrounded by **GaN** barrier layers. Our device structures over sapphire and cubic (111) spinel substrates consisted of a 10 period **GaN**-InGaIn MQW (25 Angstrom well-50 Angstrom barrier) surrounded by n- and p-**GaN** layers. Structures with both Mg-doped and undoped quantum wells (active regions) were deposited. Mesa type LED structures were then fabricated using Ti-Al and **Ni-Au** for the n- and p-ohmic contacts. Light emission was observed in a vertical cavity geometry from the sapphire or the spinel substrate side. For 250 mm diameter mesa devices the series resistances ranged from 10 to 25 Ohm. These are some of the lowest reported values. Spectral emission linewidths (FWHM) of 12, 25 and 40 nm were obtained respectively for the UV, blue, and green MQW LEDs. These linewidths are similar to those of Nakamura et al. We also report on optically pumped MQW InGaIn-**GaN** lasers with different quantum well thicknesses. In these devices, we observed the quantum shift related to the subband energy dependence on the well thickness and estimated the effective conduction band discontinuity at the **GaN**-InGaIn heterointerface from these data.

Descriptors--Author Keywords: light emitting diode ; **GaN**-InGaIn laser ; multiple quantum wells ; metal-organic chemical vapor deposition

Cited References:

KHAN MA, 1995, V66, P2046, APPL PHYS LETT

KHAN MA, 1995, MRS FALL M

NAKAMURA S, 1995, V34, PL797, JPN J APPL PHYS PT 2

NAKAMURA S, 1996, JPN J APPL PHYS 0115

SUN CJ, 1996, UNPUB APPL PHYS LETT

YANG JW, 1996, IN PRESS APPL PHYS L

?

[About IEEE](#) | [IEEE Memberships](#) | [Products and Services](#) | [Conferences](#) | [IEEE Organizations](#) | [News](#) | [Home](#)**IEEE Xplore™**

Search

[Help](#) [FAQ](#) [Terms](#)**Welcome to IEEE Xplore™**

- ☐ Home
- ☐ Log-out

Tables of Contents

- ☐ Journals & Magazines
- ☐ Conference Proceedings
- ☐ Standards

Search

- ☐ By Author
- ☐ Basic
- ☐ Advanced

Member Services

- ☐ Join IEEE
- ☐ Establish IEEE Web Account

Your search matched **5** of **699289** documents.Results are shown **15** to a page, sorted by **publication year** in **descending** order.

You may refine your search by editing the current search expression or entering a new one the t

Then click **Search Again**.**Results:**Journal or Magazine = **JNL** Conference = **CNF** Standard = **STD****1 Recessed-gate GaN MESFET using ICP-RIE for high temperature mic applications***Lee, C.; Lu, W.; Piner, E.; Adesida, I.*

Device Research Conference, 2000. Conference Digest. 58th DRC , 2000

Page(s): 41 -42

[\[Abstract\]](#) [\[PDF Full-Text\]](#) **CNF****2 Improved device performance using a semi-transparent p-contact AlGaIn/GaN heterojunction p-i-n photodiode***Collins, C.J.; Li, T.; Beck, A.L.; Dupuis, R.D.; Campbell, J.C.; Carrano, J.C.; S M.J.; Ferguson, I.A.*

LEOS '99. IEEE Lasers and Electro-Optics Society 1999 12th Annual Meeting , 1999

Page(s): 681 -682 vol.2

[\[Abstract\]](#) [\[PDF Full-Text\]](#) **CNF****3 Anger and electrical analysis of Pt/Au and Ni/An contacts to p-GaN**
King, D.J.; Zhang, L.; Ramer, J.C.; Rice, A.; Malloy, K.J.; Hersee, S.D.; Leste Wood, M.

Lasers and Electro-Optics Society Annual Meeting, 1998. LEOS '98. IEEE , Vol 1998

Page(s): 53 -54 vol.2

[\[Abstract\]](#) [\[PDF Full-Text\]](#) **CNF****4 In/sub x/Ga/sub 1-x/N/Al/sub yx/Ga/sub 1-x/N violet light emitt diodes with reflective p-contacts for high single sided light extraction***Menz, P.M.; Kellawon, P.; Van Roijen, R.; Kozodoy, P.; Denbaars, S.*

Electronics Letters , Volume: 33 Issue: 24 , 20 Nov. 1997

Page(s): 2066 -2068

[\[Abstract\]](#) [\[PDF Full-Text\]](#) **JNL**

5 Study of Schottky barriers on n-type GaN grown by LP-MOCVD*Guo, J.D.; Feng, M.S.; Pan, F.M.*Solid-State and Integrated Circuit Technology, 1995 4th International Confer
1995

Page(s): 515 -517

[\[Abstract\]](#) [\[PDF Full-Text\]](#) **CNF**[Home](#) | [Log-out](#) | [Journals](#) | [Conference Proceedings](#) | [Standards](#)[Search by Author](#) | [Basic Search](#) | [Advanced Search](#) | [Join IEEE](#) | [Establish a Web Account](#)**Copyright © 2000 IEEE -- All rights reserved**